Test 1

1 cm = ... micrometer

(a) 10^2 (b) 10^4 (c) 10^6 (d) 10^8

2 If an object moved along the circumference of a circle such that its displacement after half cycle becomes 2 π m, then the value of the covered distance is ..... .

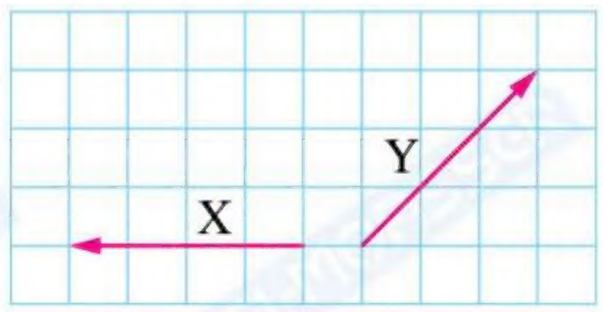
(a) π m (b) $\frac{\pi}{2}$ m (c) π^2 m (d) 2 π m

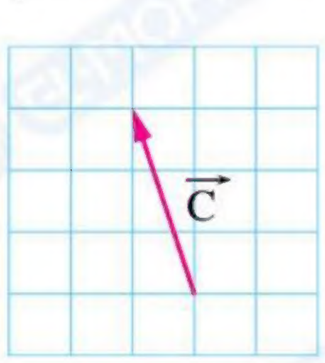
3 If A = (2 ± 0.01) m and B = (80 ± 2) cm, then the value of (A + B) equals ..... .

(a) (80.2 ± 2.01) m (b) (82 ± 2.01) cm

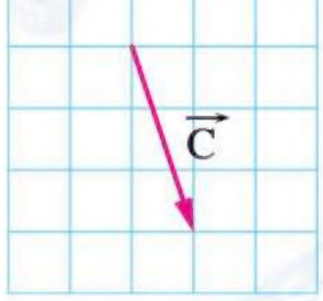
(c) (2.8 ± 2.01) cm (d) (2.8 ± 0.03) m

4 The opposite figure represents two vectors $\vec{X}, \vec{Y}$ from the same type, which of the following vectors represents the resultant vector $\vec{C}$ (Where: $\vec{C} = \vec{X} + \vec{Y}$)?

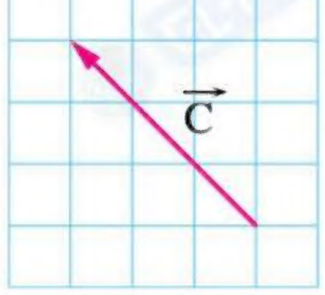




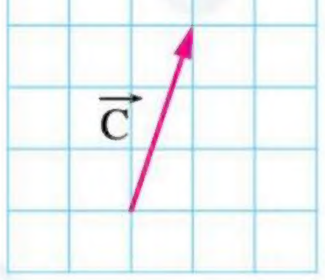
(a)



(b)



(c)



(d)

5 The most accurate tool for measuring the time taken by an object to fall from the top of a building is ..... .

(a)

(b)

(c)

(d)

6 If the dimensional formula of the physical quantity (A) is $M^2 L T^{-2}$ and the dimensional formula of the physical quantity (B) is $M^2 L T^{-2}$, so the dimensional formula of the quantity (4 A – 2 B) is ..... .

(a) $M^4 L^2 T^{-4}$ (b) $M^{-4} L^{-2} T^4$

(c) $M^2 L T^{-2}$ (d) has no physical meaning

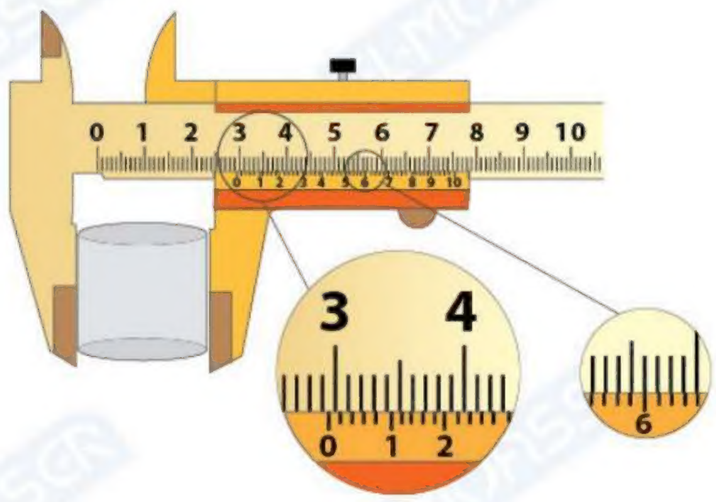
7 **Two vectors $\vec{A}$ and $\vec{B}$ of the same type are equal in magnitude and perpendicular on each other, then the operation that makes their product .....**

	Maximum	Zero
(a)	$\vec{A} \cdot \vec{B}$	$\vec{A} - \vec{B}$
(b)	$\vec{A} \cdot \vec{B}$	$\vec{A} \wedge \vec{B}$
(c)	$\vec{A} \wedge \vec{B}$	$\vec{A} - \vec{B}$
(d)	$\vec{A} \wedge \vec{B}$	$\vec{A} \cdot \vec{B}$

8 A group of students measured the density of a liquid several times, then they calculate the average of their readings. **Explain why** the students calculate the average of their readings.

9 The opposite figure illustrates a vernier caliper used to measure the radius of a metallic cylinder.

From the figure find the measured value for the thickness of the cylinder.



10 When the density of a cube was calculated, the percentage of error in measuring its mass was 2 % and the percentage of error in measuring its side length was 0.5 %, so find the percentage of error in calculating the density of the cube material.
(Knowing that: Density = $\frac{\text{Mass}}{\text{Volume}}$)

Test 2

1 When the density of a liquid is measured by a hydrometer, it is found to be $(10^3 \pm 1)\ kg/m^3$.

So, ...

	The type of measurement	The percentage of error in measurement
(a)	direct	0.1 %
(b)	direct	1 %
(c)	indirect	0.1 %
(d)	indirect	1 %

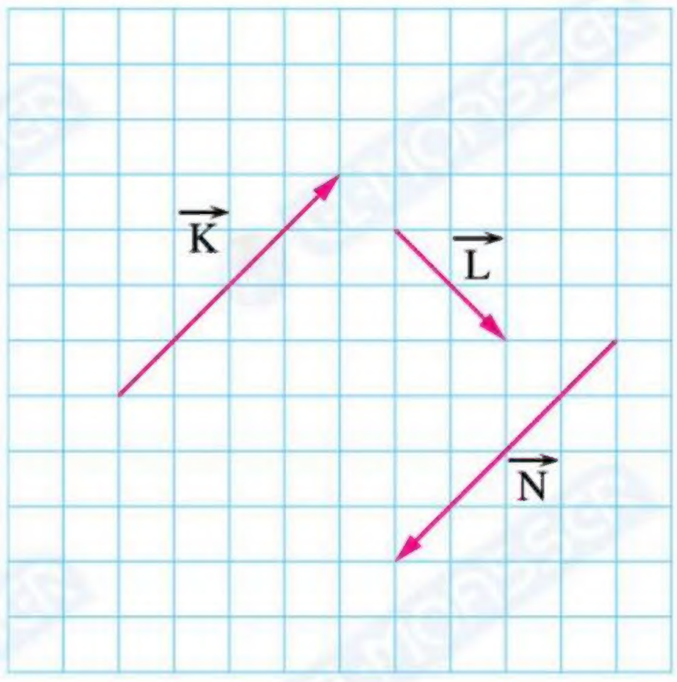
2 The opposite figure illustrates three vectors $\vec{K}, \vec{L}$ and $\vec{N}$, which of the following equations is incorrect?

(a) $\vec{K} + \vec{N} = 0$

(b) $\vec{K} - \vec{N} = 2\vec{K}$

(c) $\vec{K} = \vec{N}$

(d) $\vec{K} + \vec{L} + \vec{N} = \vec{L}$



3 The scalar product of two vectors and the magnitude of their vector product equalize when the angle between the two vectors is ..... .

(a) 75° (b) 60° (c) 45° (d) 30°

4 If x = 250 ms, y = 1500 μs, then the value of (x + y) equals ..... .

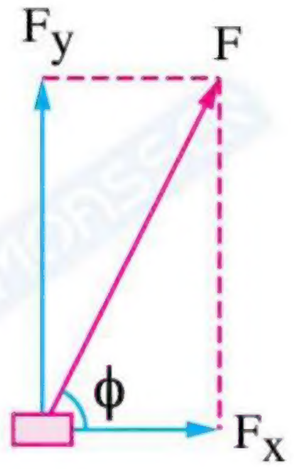
(a) 0.2515 s (b) 4 s (c) 250.15 s (d) 1750 s

5 If the height of a student is (1.8 ± 0.05) m and the height of another student is (1.95 ± 0.05) m, so the second student is taller than the first student by ..... .

(a) (3.75 ± 0.05) m (b) (3.75 ± 0.1) m

(c) (0.15 ± 0.1) m (d) (0.15 ± 0.05) m

6 **In the opposite figure, if $F_y = 2F_x$, then the value of ϕ equals** ..... .



(a) 60°

(b) 37.67°

(c) 45°

(d) 63.43°

7 **A group of students measure the velocity of a moving body, which of these measurements is more accurate?**

(a) (350 ± 20) m/s

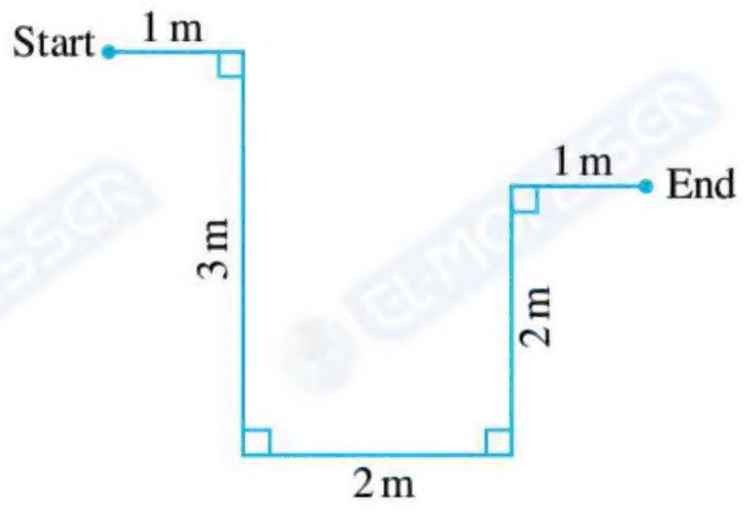
(b) (340 ± 15) m/s

(c) (335 ± 10) m/s

(d) (320 ± 10) m/s

8 A metallic ball of radius r is dropped into a tank of water, if its velocity in water was v and it is affected by a resistance force given by the relation F = Krv where K is constant, **so find** the measuring unit of constant K. (Knowing that: $[F] = MLT^{-2}$)

9 The opposite figure represents the path of a moving body, **calculate** the value of the total displacement covered by the body.



10 The radius of a circle is measured and it was found to be (10.5 ± 0.2) m, then **calculate** the area of the circle. (Knowing that: The area of the circle = πr^2)

Answers of Physics

Answers of Test 1

1 (b) 10^4 2 (c) π^2 m 3 (d) (2.8 ± 0.03) m 4 (a)

5 (c) 6 (c) $M^2 L T^{-2}$ 7 (d) $\vec{A} \wedge \vec{B}$, $\vec{A} . \vec{B}$

8 To reduce the error of measurement.

9 * Reading of the fixed scale : $X = 29$ mm $= 2.9$ cm

* Reading of the sliding scale : $x = 6 \times 0.1 = 0.6$ mm $= 0.06$ cm

* Diameter of the cylinder : $d = X + x = 2.9 + 0.06 =$ 2.96 cm

10 The relative error in measuring volume : $r_V = 3\, r_L = 3 \times 0.5 =$ 1.5 %

The relative error in measuring density : $r = r_V + r_m = 1.5 + 2 =$ 3.5 %

Answers of Test 2

1 (a) direct, 0.1 % 2 (c) $\vec{K} = \vec{N}$ 3 (c) 45° 4 (a) 0.2515 s

5 (c) (0.15 ± 0.1) m 6 (d) 63.43° 7 (c) (335 ± 10) m/s

8 $\because F = Krv$ $\therefore [K] = \frac{[F]}{[rv]} = \frac{MLT^{-2}}{LLT^{-1}} = ML^{-1} T^{-1}$

$\therefore$ The measuring unit of constant K is $kg.m^{-1}.s^{-1}$

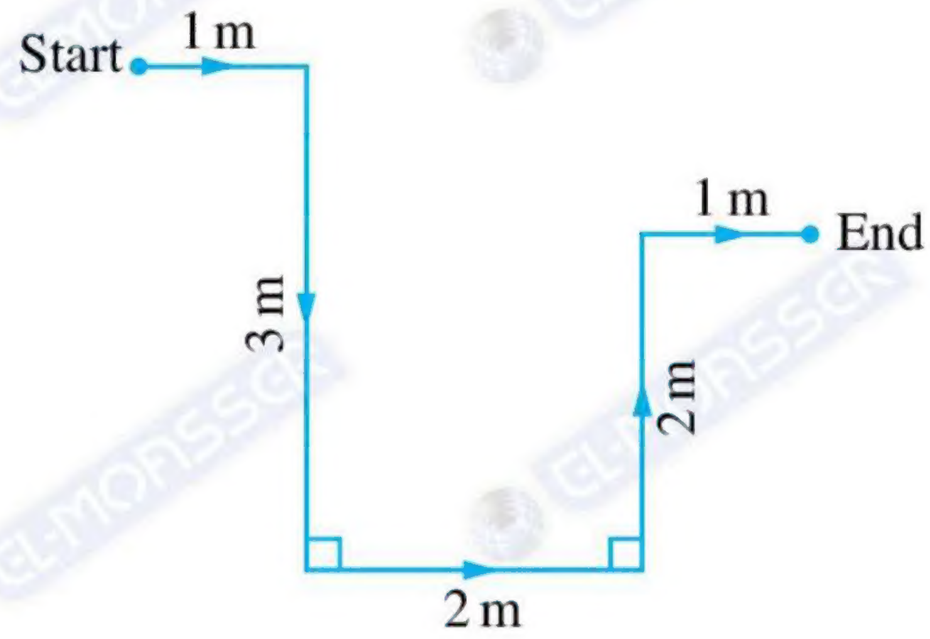
9 $d_x = 1 + 2 + 1 = 4$ m

$d_y = 3 - 2 = 1$ m

$d_{total} = \sqrt{d_x^2 + d_y^2}$

$= \sqrt{(4)^2 + (1)^2}$

$= \sqrt{17}$ m



10 $A_o = \pi R_o^2 = \frac{22}{7} \times (10.5)^2 = 346.5$ m^2

$r_A = 2\, r_R = 2 \times \frac{0.2}{10.5} = \frac{4}{105}$

$\Delta A = r_A A_o = \frac{4}{105} \times 346.5 = 13.2$ m^2

$A = (A_o \pm \Delta A) =$ (346.5 ± 13.2) m^2

Test 1 For the first month

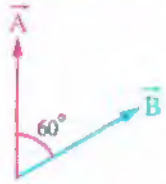
Choose the correct answer (1 : 7) :

1 Which of the following pairs of quantities represent two fundamental physical quantities?

(a) Force and displacement. (b) Absolute temperature and speed.

(c) Amount of substance and time. (d) Luminosity and volume.

2 The opposite figure illustrates two vectors $\vec{A}$, $\vec{B}$, so the ratio between their scalar product and the magnitude of their vector product equals ..... .



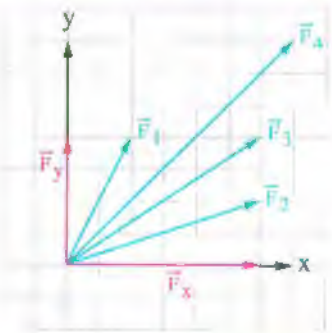
(a) $\frac{1}{\sqrt{3}}$ (b) $\frac{\sqrt{3}}{1}$ (c) $\frac{1}{2}$ (d) $\frac{2}{1}$

3 A solid cylinder that has a base radius (r) of 5 cm and a height (h) of 20 cm is made of iron that has a density of 7800 kg/m^3, so the mass of the cylinder equals ..... .

(Given that: the volume of a cylinder = $\pi r^2 h$, density = $\frac{\text{mass}}{\text{volume}}$, $\pi = \frac{22}{7}$)

(a) 1.23×10^2 g (b) 2.45×10^3 g (c) 1.23×10^4 g (d) 1.23×10^5 g

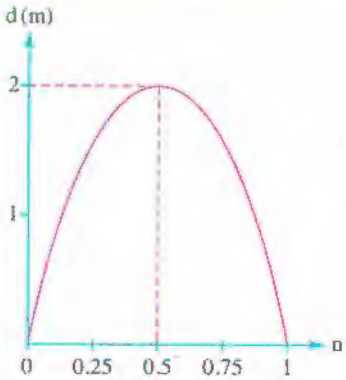
4 In the opposite figure, which of the vectors $\vec{F}_1$, $\vec{F}_2$, $\vec{F}_3$ or $\vec{F}_4$ represents the resultant of the two components $\vec{F}_x$ and $\vec{F}_y$?



(a) $\vec{F}_1$ (b) $\vec{F}_2$

(c) $\vec{F}_3$ (d) $\vec{F}_4$

5 The opposite graph represents the relation between the magnitude of displacement (d) for a body moving in a circular path and the number of revolutions (n) made by the body, so the distance covered by the body through a complete revolution equals ..... .



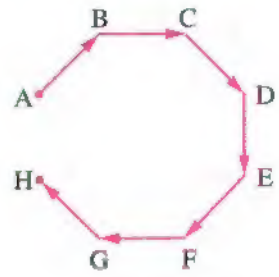
(a) 2 m (b) π m

(c) 4 m (d) 2π m

6 If $x = (100 \pm 0.01)$ m and $y = (200 \pm 0.03)$ m, the absolute error in calculating the quantity $(y - x)$ equals ..... .

(a) 0.04 m (b) 0.03 m (c) 0.02 m (d) 0.01 m

7 The opposite figure illustrates the path of a body while moving on an octagon of side length 10 m, so the total displacement of the body equals ..... .



(a) 70 m in direction $\overrightarrow{AH}$

(b) 70 m in direction $\overrightarrow{HA}$

(c) 10 m in direction $\overrightarrow{AH}$

(d) 10 m in direction $\overrightarrow{HA}$

Answer the following questions (8 : 10) :

8 Given that the measuring unit of acceleration is m/s^2 and its dimensional formula is L^xT^y, **what** are the values of x and y?

.....

.....

9 Two vectors $\vec{A}$ and $\vec{B}$ have a resultant vector $\vec{C}$. The horizontal and vertical components of vector $\vec{A}$ respectively are 3 units and 4 units while the horizontal and vertical components of vector $\vec{B}$ respectively are 6 units and 8 units, **calculate** the magnitude of vector $\vec{C}$.

.....

.....

.....

10 **Why**, when making a measurement, is it preferable to repeat the measurement several times then calculating the average of the obtained measurements?

.....

.....

Test 2

For the first month

Choose the correct answer (1 : 7) :

1 Which of the following processes is an indirect measurement?

(a) Measuring the mass of an object using a scale.

(b) Measuring the volume of a liquid using a graduated cylinder.

(c) Measuring the area of a room using meter tape.

(d) Measuring the density of a liquid using a hydrometer.

2 If x and y are two physical quantities where the dimensional formula of x is $L\,T^{-2}$ and the dimensional formula of y is ML^{-1}, which row of the following table represents the dimensional formulae of the shown quantities?

	$\frac{y}{x}$	$x + y$
(a)	$ML\,T^{2}$	$ML\,T^{-2}$
(b)	$ML^{-2}\,T^{-2}$	$ML\,T$
(c)	$ML\,T^{2}$	impossible
(d)	$ML^{-2}\,T^{2}$	impossible

3 If the scalar product of two vectors equals two thirds of the magnitude of their vector product, the angle between the two vectors equals ..... .

(a) 30° (b) 56.3° (c) 33.69° (d) 45°

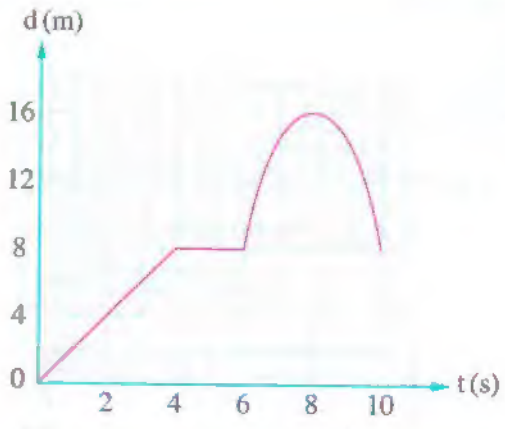
4 The opposite graph represents the relation between displacement (d) and time (t) for a body moving in a straight line, so the total distance covered by the body through the 10 s equals ..... .

(a) 0

(b) 8 m

(c) 16 m

(d) 24 m



5 The opposite figure illustrates two forces $\vec{F}_1$ and $\vec{F}_2$ acting on a body, so the net force affecting the body equals ..... .

(a) 10 N in the direction of $\vec{F}_2$
(b) 10 N in the direction of $\vec{F}_1$
(c) 2 N in the direction of $\vec{F}_2$
(d) 2 N in the direction of $\vec{F}_1$

6 Two vectors have equal magnitudes, the angle between them is 60° and their scalar product is 9 units, the magnitude of each of the two vectors equals ..... .

(a) 3 units (b) $3\sqrt{2}$ units (c) 6 units (d) 9 units

7 Pressure is measured in the units of pascal which is equivalent to $kg.m^{-1}.s^{-2}$ while electric current intensity is measured in the units of ampere which is equivalent to coulomb/second, then which of the following statements is correct?

(a) Pressure is a fundamental quantity, while electric current intensity is a derived quantity.
(b) Pressure is a derived quantity, while electric current intensity is a fundamental quantity.
(c) Both pressure and electric current intensity are fundamental quantities.
(d) Both pressure and electric current intensity are derived quantities.

Answer the following questions (8 : 10) :

8 A vector $\vec{A}$ makes an angle of 30° with its vertical component while its horizontal component equals 5 units, **calculate** the magnitude of vector $\vec{A}$.

.....
.....

9 The similarity of the dimensional formulae of both sides of an equation doesn't prove that the equation is correct. **Explain.**

.....
.....

10 An object moves in a straight line with a uniform speed such that it covers a distance of (10 ± 0.1) m through (5 ± 0.1) s, **calculate** the speed of the object.

$\left(\text{Given that: speed} = \frac{\text{distance}}{\text{time}}\right)$

.....
.....

Answers of Test 1 on the 1st Month

1. © Amount of substance and time.
2. ⓐ $\frac{1}{\sqrt{3}}$
3. © 1.23×10^{4} g
4. © $\overline{F}_3$
5. ⓓ $2\pi m$
6. ⓐ 0.04 m
7. © 10 m in direction $\overrightarrow{AH}$
8. ∵ The measuring unit of acceleration is $m.s^{-2}$.

   ∴ Its dimensional formula is $L\,T^{-2}$.

   ∴ $L^x T^y = L\,T^{-2}$

   ∴ $x = 1$, $y = -2$
9. $A = \sqrt{A_x^2 + A_y^2} = \sqrt{(3)^2 + (4)^2} = 5$ units

   $\tan \theta_A = \frac{4}{3}$ $\theta_A = 53.13°$

   $B = \sqrt{B_x^2 + B_y^2} = \sqrt{(6)^2 + (8)^2} = 10$ units

   $\tan \theta_B = \frac{8}{6} = \frac{4}{3}$, $\theta_B = 53.13°$

   ∵ $\theta_A = \theta_B$

   ∴ The two vectors $\overline{A}$ and $\overline{B}$ are in the same direction.

   ∴ $C = A + B = 5 + 10 = 15$ units

   Another Solution:

   $C_x = A_x + B_x = 3 + 6 = 9$ units

   $C_y = A_y + B_y = 4 + 8 = 12$ units

   $C = \sqrt{C_x^2 + C_y^2} = \sqrt{(9)^2 + (12)^2} = 15$ units
10. To reduce the measuring error.

Answers of Test 2 on the 1st Month

1. (c) Measuring the area of a room using meter tape.
2. (d) $ML^{-2}T^{2}$, impossible
3. (b) 56.3°
4. (d) 24 m
5. (d) 2 N in the direction of $\overline{F}_1$
6. (b) $3\sqrt{2}$ units
7. (b) Pressure is a derived quantity, while electric current intensity is a fundamental quantity.
8. $\because A_x = A \cos\theta$

   $\therefore 5 = A \cos(90 - 30)$, $\therefore A = 10$ units
9. Because there might be numerical values in any of the sides of the equation, where numbers have no dimensions.
10. $r_v = r_d + r_t = \frac{\Delta d}{d_o} + \frac{\Delta t}{t_o} = \frac{0.1}{10} + \frac{0.1}{5} = 0.03$

    $v_o = \frac{d_o}{t_o} = \frac{10}{5} = 2$ m/s

    $\Delta v = r_v \, v_o = 0.03 \times 2 = 0.06$ m/s

    $v = (v_o \pm \Delta v) = (2 \pm 0.06)$ m/s

Test on Chapter 1

Physical Measurements

Part I Choose the correct answer

1. The suitable method for measuring the thickness of a thin sheet accurately is .....


(a)


(b)


(c)


(d)

2. The mass of a cube and the length of one of its sides were measured, where the relative error in measuring its mass was 2 % and the relative error in measuring its side length was 1.5 %, then the relative error in measuring its density is .....

(Knowing that: Density = $\frac{\text{Mass}}{\text{Volume}}$)

(a) 0.5 % (b) 3.5 % (c) 6.5 % (d) 9.5 %

3. If the radius of a particle is 5.1 nm, then the diameter of the particle equals .....

(a) 10.2×10^{-3} μm (b) 1.02×10^{-7} mm

(c) 10.2×10^{-8} m (d) all the previous

4. If the dimensional formula of a physical quantity is $M^x L^x T^{x-3}$ where x is an integer number, by using the opposite table this quantity may be the .....

(a) force (b) acceleration

(c) work (d) velocity

The physical quantity	The measuring unit
Force	$kg.m/s^2$
Acceleration	m/s^2
Work	$kg.m^2/s^2$
Velocity	m/s

5. An empty large box of mass (20 ± 0.01) kg, when a man sits inside the box, the mass of the box and the man together becomes (0.1 ± 0.001) ton, so the mass of the man is .....

(a) (120 ± 0.009) kg (b) (120 ± 0.011) kg

(c) (80 ± 1.01) kg (d) (80 ± 0.99) kg

6. If the dimensional formula of a physical quantity is $M L T^{-1}$, then its measuring unit is .....

(a) kg.m.s (b) $kg.m.s^{-1}$ (c) $kg.m^{-1}.s^{-1}$ (d) $kg.m^{-1}.s$

7 How many bottles of volume 1000 cm^3 are needed to fill a tank of capacity 1 m^3?

(a) 1 (b) 10 (c) 1000 (d) 100

8 If the dimensions of quantity x are $M^0 L^0 T$ and the dimensions of quantity y are $ML T^{-1}$, then the dimensions $ML T^{-2}$ describe the quantity .....

(a) x y (b) $x y^2$ (c) $\frac{x}{y}$ (d) $\frac{y}{x}$

9 The length of a rectangle was measured to be (6 ± 0.01) cm and its width was measured to be (4 ± 0.01) cm, then the percentage of error in measuring the perimeter of the rectangle is .....

(a) 0.2 % (b) 0.4 % (c) 0.8 % (d) 2 %

10 If the dimensions of A are $L^2 T$ and the dimensions of B are $L T^2$, then the dimensions of the quantity A – 3 B are .....

(a) $L^3 T^3$ (b) L T (c) $L^2 T^2$ (d) not defined

11 Which of the following lengths is larger?

(a) 10^{-2} mm (b) 1 µm (c) 10^4 nm (d) 10^{-6} Gm

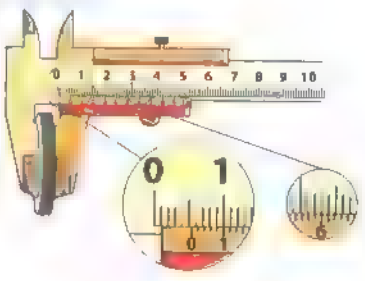
12 Given that: (F) is the force, (m) is the mass, (a) is the acceleration, $[F] = MLT^{-2}$ and $[a] = LT^{-2}$, which of the following equations might be correct?

(a) $F = \frac{m}{a}$ (b) $F = ma^2$ (c) $F = \frac{a}{m}$ (d) F = ma

13 If the equation $(d = xv + \frac{1}{2} a y^2)$ describes the motion of a body, where the dimensions of the quantities d, v and a are L, $L T^{-1}$ and $L T^{-2}$ respectively, the dimensions of both x and y are .....

	Dimensions of x	Dimensions of y
(a)	T	T
(b)	T	T^2
(c)	T^{-1}	T
(d)	T^{-1}	T^2

14 The opposite figure shows a vernier caliper being used to measure the thickness of a metallic coin, then the measured value of the coin thickness is .....



a 5.6 cm b 1.6 cm

c 5.6 mm d 1.6 mm

Second Answer the following questions

15 **Why** is not the glass used in manufacturing a standard meter?

16 "The absolute error is the best indicator for measurement accuracy"

Discuss the validity of the previous sentence.

Test on Chapter **2**

Scalar and Vector Quantities

Choose the correct answer

1 The magnitude of the vector product of the two vectors $\vec{A}$ and $\vec{B}$ in figure (1) is ..... of the two vectors $\vec{A}$ and $\vec{B}$ in figure (2).

a greater than the magnitude of the vector product

b less than the magnitude of the vector product

c equal to the magnitude of the vector product

d equal to the scalar product

Figure (1) Figure (2)

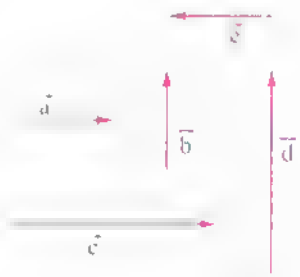
2 The following figure represents a group of vectors, then vector $\vec{c}$ equals .....

a $1.5\,\vec{b}$

b $-2\,\vec{e}$

c $\vec{d}$

d $-2\,\vec{a}$



3 If the distance covered by a body moving in a circular path after $\frac{1}{8}$ revolution is 22 m, then its displacement during $\frac{1}{4}$ revolution equals .....

a 28 m

b 44 m

c $14\sqrt{2}$ m

d $28\sqrt{2}$ m

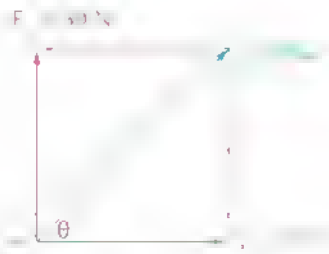
4 In the opposite figure, there are two perpendicular forces F_x and F_y, so the value of angle θ is .....

a 30°

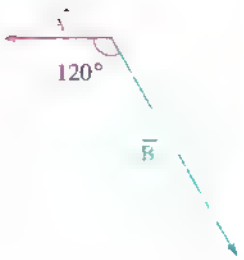
b 60°

c 45°

d 90°

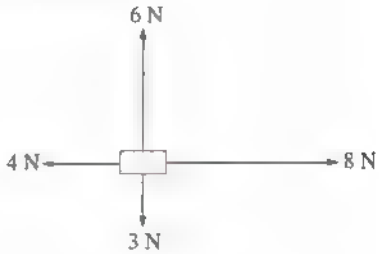


5 The opposite figure shows two vectors $\vec{A}$ and $\vec{B}$ that have magnitudes of 50 units and 150 units respectively. The magnitude and the direction of their vector product $(\vec{A} \wedge \vec{B})$ are ..... and ..... respectively.



(a) 6495.19 units, perpendicular into the page
(b) 6495.19 units, perpendicular out of the page
(c) 3750 units, perpendicular into the page
(d) 3750 units, perpendicular out of the page

6 The opposite figure shows four forces acting on a body, so the magnitude and the direction of their resultant are ..... and ..... respectively.

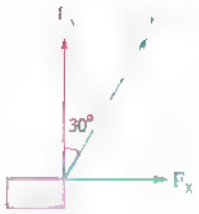


.. 8 N, makes angle 53.13° with the horizontal
(b) 8 N, makes angle 45° with the horizontal
(c) 5 N, makes angle 36.87° with the horizontal
(d) 5 N, makes angle 30° with the horizontal

7 If the Earth orbits the Sun in a circular path of radius 1.5×10^{11} m and it completes one revolution every solar year, then the magnitude of the displacement of the Earth during three months is ..... (Neglecting the motion of the Sun)

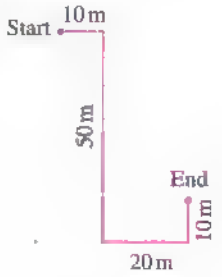
(a) $\sqrt{2} \times 10^{11}$ m
(b) 3×10^{11} m
(c) $2\sqrt{2} \times 10^{11}$ m
(d) 2.12×10^{11} m

8 In the opposite figure, force F is the resultant of the two forces F_x and F_y, then .....



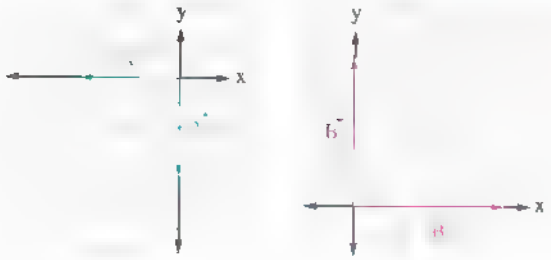
(a) $F_x < F_y < F$
(b) $F_y < F_x < F$
(c) $F < F_y < F_x$
(d) $F_y < F < F_x$

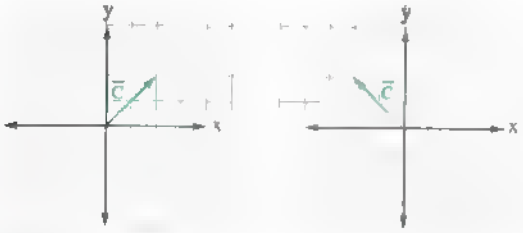
9 If a body moves in the shown path, then the magnitude of the displacement and the distance covered by it are ..... and ..... respectively.



(a) 50 m, 50 m
(b) 50 m, 90 m
(c) 90 m, 90 m
(d) 90 m, 20 m

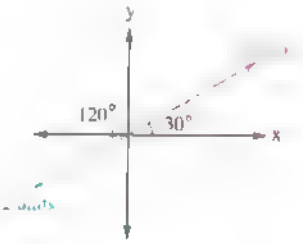
10 The opposite figures represent the components of vectors $\vec{A}$ and $\vec{B}$, so which of the following figures may represent the resultant of the two vectors?





ⓐ ⓑ ⓒ ⓓ

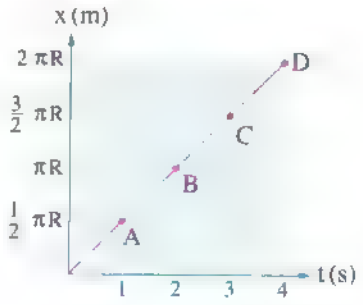
11 Two vectors of magnitudes 2 units and 2.5 units have directions as shown in the opposite figure, so the scalar product of the two vectors equals .....



ⓐ 0 ⓑ $\frac{-5\sqrt{3}}{2}$ units

ⓒ – 5 units ⓓ 5 units

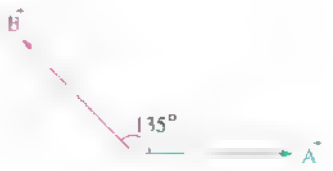
12 The opposite graph of distance versus time represents the motion of a body in a circular path of radius R, so the ratio between the magnitude of its displacement when it reaches point A and the magnitude of its displacement when it reaches point B equals .....



ⓐ $\frac{1}{1}$ ⓑ $\frac{\sqrt{2}}{2}$

ⓒ $\sqrt{2}$ ⓓ $\frac{1}{2}$

13 The opposite figure shows two vectors $\vec{A}$ and $\vec{B}$, where A = 8 cm and the resultant of the two vectors is perpendicular to $\vec{A}$, so the magnitude of vector $\vec{B}$ equals .....



ⓐ $4\sqrt{2}$ cm ⓑ 4 cm

ⓒ 8 cm ⓓ $8\sqrt{2}$ cm

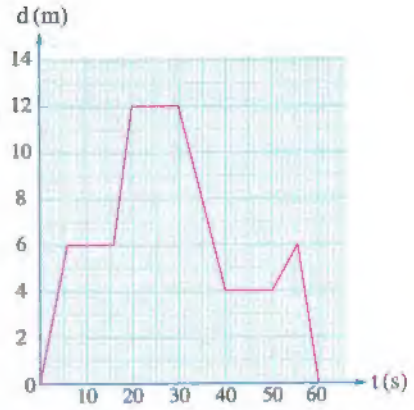
14 The opposite (displacement-time) graph describes the motion of a man moving in a straight track, so the distance covered by the man equals .....

(a) 0

(b) 12 m

(c) 26 m

(d) 28 m



Second Answer the following questions

15 **Which of the following mathematical expressions is right? And which is wrong?**

(1) $(\vec{A} + \vec{B}) + (\vec{B} \cdot \vec{C})$

(2) $(\vec{A} \cdot \vec{B}) + (\vec{B} \wedge \vec{C})$

16 Vector $\vec{A}$ has a horizontal component of 4 cm and a vertical component of – 7.5 cm. Vector $\vec{B}$ has a horizontal component of – 2.5 cm and a vertical component of 5 cm. If $\vec{C} = \vec{A} + \vec{B}$, **find** the components of vector $\vec{C}$.

Accumulative Test on Unit **1**

Physical Quantities and Measuring Units

First Choose the correct answer

1. Which statement using prefixes of the base unit meter (m) is not correct?
   (a) $1\ pm = 10^{-12}\ m$
   (b) $1\ nm = 10^{-9}\ m$
   (c) $1\ Mm = 10^{6}\ m$
   (d) $1\ Gm = 10^{12}\ m$

2. The best way to judge the accuracy of measurement is through .....
   (a) the absolute error
   (b) the relative error
   (c) the product of the relative error and the absolute error
   (d) all of them

3. If the vector product of two vectors $\vec{A} \wedge \vec{B} = \vec{C}$, hence $\vec{A} \cdot \vec{C}$ = ...
   (a) $\vec{A}$
   (b) $\vec{B}$
   (c) $\vec{C}$
   (d) 0

4. If the kinetic energy of a body is given by the relation $\frac{1}{2}\ mv^2$, then its dimensional formula is .....
   (a) $ML^2\ T^2$
   (b) $ML\ T^{-2}$
   (c) $ML^{-1}\ T^{-2}$
   (d) $ML^2\ T^{-2}$

5. The vernier caliper is used in measuring .....
   (a) small masses
   (b) the distance between cities
   (c) small lengths
   (d) large intervals of time

6. For the resultant of two vectors to be maximum, the angle between them must be .....
   (a) 0°
   (b) 60°
   (c) 90°
   (d) 180°

7. If two forces $F_1 = 4\ N$ and $F_2 = 3\ N$ acted on a body, then the net force on the body is .....
   (a) 7 N
   (b) 5 N
   (c) 1 N
   (d) between 1 N and 7 N

8 Two vectors $\vec{F}_x$ and $\vec{F}_y$ are perpendicular, if F_x is double vector F_y, so the angle θ between the resultant vector and $\vec{F}_x$ equals ..... .

(a) 26.56° (b) 30°

(c) 60° (d) 63.43°

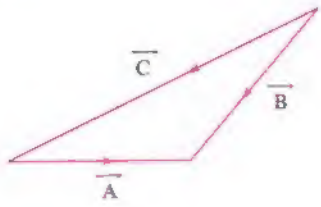
9 Which of the following choices describes the opposite figure?

(a) $\vec{A} + \vec{B} = \vec{C}$

(b) $\vec{B} + \vec{C} = \vec{A}$

(c) $\vec{C} + \vec{A} = \vec{B}$

(d) $\vec{A} + \vec{B} + \vec{C} = 0$



10 Hassan measured the length of a building by a meter tape, it was found to be (10 ± 0.1) m, then ..... .

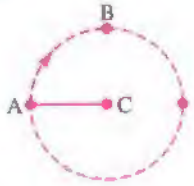
	The type of measurement	The absolute error	The relative error
(a)	direct	10 m	0.01
(b)	direct	0.1 m	0.01
(c)	indirect	10 m	0.001
(d)	indirect	0.1 m	10.1

11 The atom of gold has a diameter of 0.26 nm and the diameter of its nucleus is 5.6×10^{-3} pm, so the ratio of the diameter of the atom to that of its nucleus equals .....

(a) 46.43 km (b) 46.43×10^3 (c) 46.43×10^3 m (d) 46.43

12 In the opposite figure:

If a body moved on the circle from point A to point B, the ratio between the covered distance and the displacement of the body equals .....



(a) $\frac{\pi}{2}$ (b) π (c) $\frac{\pi}{2\sqrt{2}}$ (d) $\frac{\pi}{\sqrt{2}}$

13 If $x = (5 \pm 0.1)$ m and $y = (7 \pm 0.2)$ s, so $(\frac{x}{y})$ equals .....

(a) $(71 \pm 3.4)\ 10^{-2}$ m/s (b) (0.71 ± 0.034) m

(c) (0.71 ± 0.3) m/s (d) (0.71 ± 0.3) m

14 If the relative error in measuring the area of a room is 0.04 and the actual area is 45 m^2, the absolute error in measuring the area is .....

(a) 0.45 m^2 (b) 0.45 (c) 1.8 (d) 1.8 m^2

Second Answer the following questions

15 Cylinder of radius 5 cm and height 20 cm, is made of iron of density 7800 kg/m^3, **find:**

(a) The volume of the cylinder in nm^3.

(b) The mass of the cylinder in mg.

16 Two equal magnitudes of forces $|\overrightarrow{F_1}| = |\overrightarrow{F_2}|$ act on an object. If their resultant has a magnitude of 35 N and makes an angle 45° to $\overrightarrow{F_1}$, **find:**

(a) The magnitudes of F_1 and F_2

(b) The dot product and the cross product of the two forces.